

We Claim:

1. A variable displacement pump comprising:
a pump body having an outer ring defining an inner cavity, wherein the inner cavity further defines a pump suction path and a pump discharge path in fluid communication with said inner cavity;
5 a cam ring pivotably supported in said inner cavity by a pivot pin formed on a portion of an inner diameter of said outer ring;
an actuated cam formed on said cam ring;
an actuator linked to said cam ring for moving said cam ring in a
10 pivotable motion; and
a control module linked to said actuator.
2. The variable displacement pump of claim 1, wherein the control module is configured to receive measurements from at least one sensor linked to an engine and at least one sensor linked to a power steering system.
- 15 3. The variable displacement pump of claim 2, wherein said inner cavity is defined between an inner diameter of the outer ring and an outer diameter of the cam ring.
4. The variable displacement pump of claim 3, wherein the actuated cam is formed in between another portion of the inner diameter of the outer ring and a
20 portion of the outer diameter of the cam ring.
5. The variable displacement pump of claim 4, wherein said actuated cam comprises a cam pivot formed thereon, said cam pivot is connected to an actuated arm of the actuator.
6. The variable displacement of claim 5, wherein the actuator is linked to
25 the cam ring through the actuated cam, the actuated arm and the cam pivot.
7. The variable displacement of claim 6, further comprising:
a fluid pressure chamber formed in the inner cavity through a seal means;

a rotor having a plurality of vanes and mounted on a rotating shaft
inside said cam ring; and

a pump chamber formed between the inner diameter of the cam ring
and an outer diameter of the rotor and having a first opening in said suction path and
5 a second opening in said discharge path.

8. The variable displacement pump of claim 7, wherein said actuator is an
electronic actuator.

9. The variable displacement pump of claim 8, further comprising a
control module to control said electronic actuator.

10 10. The variable displacement pump of claim 9, wherein said control
module is a microprocessor.

11. The variable displacement pump of claim 10, wherein the control
module receives measurements from an engine and a power steering system from a
vehicle.

15 12. The variable displacement pump of claim 11, wherein the electronic
actuator moves the cam ring responsive to measurements of an engine speed from
the engine and measurements of pressure from the power steering system.

13. A variable displacement pump comprising:
a pump body having an outer ring defining an inner cavity, wherein the
20 inner cavity further defines a pump suction path and a pump discharge path in fluid
communication with said inner cavity;
a cam ring pivotably supported in said inner cavity by a pivot pin
formed on a portion of an inner diameter of said outer ring;
an actuator linked through a screw arm to said cam ring for moving
25 said cam ring in a pivotable motion; and
a control module linked to said actuator.

same as
claim 2

14. The variable displacement pump of claim 1, wherein the control module is configured to receive measurements from at least one sensor linked to an engine and at least one sensor linked to a power steering system.

5 15. A device for adjusting the amount of fluid flowing through a variable displacement pump of a vehicle, comprising:

a control module configured to receive measurements of pressure from a power steering system and measurements of an engine speed from an engine of the vehicle, said control module configured to produce pump control signals; and

10 a cam ring disposed in said variable displacement pump, said ring being actuatable in response to said pump control signals from said control module.

16. A method for adjusting the amount of fluid flowing in a variable displacement pump, the method comprising:

15 providing a cam ring pivotably supported in an inner cavity of a pump body by a pivot pin formed on a portion of an inner diameter of the pump body and a portion of an outer diameter of said cam ring;

providing an actuator linked to said cam ring;

receiving measurements at the control module;

transmitting the measurements from the control module to the actuator;

and

20 adjusting the cam ring via said actuator in response to the measurements.

17. The method for adjusting the amount of fluid flowing in a variable displacement pump of claim 16, wherein the actuator is an electronic actuator.

25 18. The method for adjusting the amount of fluid flowing in a variable displacement pump of claim 17, further comprising providing an actuated arm, an actuated cam and a cam pivot to connect the electronic actuator to the cam ring.

19. The method for adjusting the amount of fluid flowing in a variable displacement pump of claim 17, further comprising providing a screw arm to connect the electronic actuator to the cam ring.

20. The method for adjusting the amount of fluid flowing in a variable displacement pump of claim 19, further comprising moving the cam ring in a pivotable motion.

21. The method for adjusting the amount of fluid flowing in a variable displacement pump of claim 17, wherein the control module receives measurements from an engine and measurements from a power steering system of a vehicle.

22. The method for adjusting the amount of fluid flowing in a variable displacement pump of claim 21, wherein the electronic actuator moves the cam ring responsive to measurements of an engine speed from the engine and measurements of pressure from the power steering system.

23. A system for adjusting the amount of fluid flowing in a variable displacement pump in a vehicle, the system comprising:
a power steering system in said vehicle, said power steering system comprising:
a variable displacement pump, said variable displacement pump including a pumping chamber and a pivotably mounted cam ring inside said pumping chamber;
an engine mounted in said vehicle;
a control module configured to receive measurements of pressure from the power steering system and measurements of an engine speed from the engine to move said cam ring and adjust pressure in the variable displacement pump.

24. The system for adjusting the amount of fluid going flowing in a variable displacement pump in a vehicle of claim 23, wherein the actuator is an electronic actuator.

25. The system for adjusting the amount of fluid going flowing in a variable displacement pump in a vehicle of claim 24, further comprising the electronic actuator connected to the control module, wherein the electronic actuator is responsive to the control module.

5

104055 550400